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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Qualcomm Incorporated
Patents Department
5775 Morehouse Drive
San Diego, CA 92121-1714

EXAMINER

STORM, DONALD L

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 06/24/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/557,282

Applicant(s)

ANANTHAPADMANABHAN ET AL.

Examiner

Donald L. Storm

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-11,13-20 and 22-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,13-20 and 22-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 May 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

The Applicant's Response to Final Office Action, filed on May 13, 2003 (paper 10), has been entered.

Drawings

2. The proposed substitute drawings submitted by the Applicant were received on May 13, 2003 (paper 12), and these drawing sheets are substantively acceptable to the Examiner. These drawings have been entered and are now the Figs. 9 and 10 of record.

Claim Informalities

3. Claims 1, 3-9, 11, 13-20, and 22-28 are objected to under 37 CFR 1.75(a) because some phrases need clarification. By comparison with the Marked up version of amendments to the Claims (a section of the Applicant's submission), the Examiner believes that the clean version of the claims entered into the application contain phrases that were intended to be deleted. To advance prosecution, the Examiner has NOT considered the following phrases as claim limitations:

- a. in claim 1, line 3, the bracket "[]";

- b. in claim 11, lines 6-7, the bracketed phrase “[the at least one weighted value]”; and
- c. in claim 20, line 8, the bracketed phrase “[the at least one weighted value]”.

Claims 3-9, 13-19, and 22-28 inherit the problems of claims 1, 11, and 20 by dependency.

Claim Rejections - 35 USC § 103

Fette and Kleider

4. Claims 1, 3-6, 10, 11, 13-16, 20, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al. [US Patent 5,255,339] in view of Kleider [US Patent 6,301,265], both already of record.

5. Regarding claim 10, Fette [at abstract] describes a speech coder to quantize information about speech comprising:

a parameter of speech for a plurality of previously processed frames [at column 13, lines 45-65, as Pitch(1), Pitch(2), and Pitch (3) of frames $m=1, 2, 3$ processed before the current frame $m=4$];

means for generating a plurality of values of the parameter for a plurality of previously processed frames of speech [at column 14, lines 57-60, as speech analyzer extracts pitch of four frames of speech];

weights [at column 13, line 66, as $Pweight(m)$ divided by $Sum(m=1,4)(Pweight(m))$];

the value is a weighted value [at column 13, line 66, as $(Pweight(m)*Pitch(m))$ divided by $Sum(m=1,4)(Pweight(m))$];

the sum of all weights used is one [at column 11, line 66, as $Sum(m=1,4)(Pweight(m))$ divided by $Sum(m=1,4)(Pweight(m))$];

a sum of the plurality of weighted values [at column ¹³~~66~~, line ⁶³⁻⁶⁴~~66~~, as AvgPitch].

Fette does not explicitly describe any currently processed frames of speech other than the mth frame of the super frame. However, Fette [at column 15, lines 47-51] point out that is obvious that the same processing repeats and continues. In view of this description by Fette, it would have been obvious to one of ordinary skill in the art of processing framed speech at the time of invention that Fette's passing speech provides 4 subsequent frames that become frames m=1,2,3, and a currently processed frame m=4, which provide the next values of pitch, weights, and AvgPitch of the new, next currently processed frame. According, Fette makes obvious the limitation:

a value of the parameter for a currently processed frame of speech [as AvgPitch of the new, next currently processed frame].

Fette [at column 7, line 59-column 8, line 5] selects and uses different modes of quantization and coding for superframes of up to four speech frames. However, Fette does not explicitly choose a subtraction and difference-coding alternative for the quantization.

Kleider [at column 14, lines 30-37] also describes a speech coder and quantizer. Like Fette, Kleider [at column 4, lines 28-41] selects and uses different modes of quantization and coding for superframes of voicing, pitch, energy, etc. As one of the selectable quantization and coding modes, Kleider describes:

means for subtracting the value for a parameter for a current frame of speech to yield a difference [at column 7, line 67-column 8, line 1, as a delta quantizer characterizes the change from the previous frame]; and

means for quantizing the difference [at column 5, lines 54-56 and column 7, line 67-column 8, line 1, as a delta quantizer implements coding changes since a previous frame].

Thus Fette with Kleider makes obvious:

a sum of Fette's weighted values [as AvgPitch calculated as the sum for the previous superframe's frames]; and

subtracting that sum from the value of the parameter for a currently processed frame [as subtract AvgPitch for the previous superframe from the AvgPitch for the current superframe].

Both Fette [at column 7, lines 59-63] and Kleider [at column 1, lines 21-23] describe solutions to effective coding of speech using alternative quantization methods to adapt the transmission rate. Both Fette and Kleider use a superframe constructed from sequences of speech frames. In view of the commonalities of Fette and Kleider, it would have been obvious to one of ordinary skill in the art of speech coding at the time of invention to include Kleider's concept of delta coding for superframe parameters as a choice for coding Fette's superframe. Using Kleider's concept with Fette would provide an advantageous alternative because Kleider [at column 2, lines 36-59] points out that it controls bit rate based on network conditions and allows graceful degradation with packet errors.

6. Claim 11 is set forth with limitations similar to claim 10. Fette and Kleider describe and make obvious those limitations as indicated there, where Fette's and Kleider's quantizer and coder are infrastructure elements.

7. Claim 13 is set forth including the limitations of claim 11. Fette and Kleider describe and make obvious those limitations as indicated there. Fette also describes additional limitations as follows:

the speech is voiced [at column 13, line 48, as voiced frames].

8. Claim 14 is set forth including the limitations of claim 11. Fette and Kleider describe and make obvious those limitations as indicated there. Fette also describes additional limitations as follows:

the parameter is a pitch [at column 13, line 66, as pitch];

the pitch is a lag value [at column 1, lines 43-44, as pitch period].

9. Claim 15 is set forth including the limitations of claim 11. Fette and Kleider describe and make obvious those limitations as indicated there. Fette also describes additional limitations as follows:

the parameter is an amplitude value [at column 12, lines 39-40, as energy in the calculation of RMS energy. See, for example, "The IEEE Standard Dictionary of Electrical and Electronic Terms," Sixth Ed., Dec. 1996, pages 934-935, as evidence that the energy is weighted by weights that sum to unity when calculating the RMS energy].

10. Claim 16 is set forth including the limitations of claim 11. Fette and Kleider describe and make obvious those limitations as indicated there. Fette also describes additional limitations as follows:

compute the value for the current frame of speech [at column 13, line 66, as Pitch(m=4)].

11. Claim 1 sets forth a method with limitations comprising the functionality associated with using the apparatus recited in claim 1, where Fette and Kleider describe make obvious subtracting the plurality of the weighted parameters, namely $(Pweight(m)*Pitch(m))$ divided by

Sum(m=1,4)(Pweight(m)), because the parameter for frame 3 is added to parameter for frame 2, which is added to the parameter for frame 1 when forming the AvgPitch. (The addition may occur in any order because addition is commutative.) Because Fette and Kleider describe and make obvious the similar limitations of claim 11 as indicated there, this claim thus is unpatentable accordingly.

12. Claims 3-6 set forth a method with limitations comprising the functionality associated with using the apparatus recited in claims 13-16. Because Fette and Kleider describe and make obvious those similar limitations as indicated there, these claims thus are unpatentable accordingly.

13. Claims 20 and 22-25 are set forth with limitations similar to claims 11, 13-16 respectively. Fette and Kleider describe and make obvious those limitations as indicated there. Fette also describes additional limitations as follows:

a processor [at column 5, lines 33-34, as microprocessor]; and
a storage medium coupled to the processor and containing instructions executable by the processor [at column 5, lines 34-38, as microprocessor acts to execute instructions stored in ROM].

Fette and Kleider and Marston

14. Claims 7-9, 17-19, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fette et al. [US Patent 5,255,339] in view of Kleider [US Patent 6,301,265] and further in view of Marston [EP 0 987 680 A1], all already of record.

15. Claim 17 is set forth including the limitations of claims 11 and 16. Fette and Kleider describe and make obvious those limitations as indicated there.

Fette [at column 7, lines 8-19] also describes spectral information in terms of LPC analysis and conversion among representative speech parameters.

However, neither Fette nor Kleider explicitly obtains and represents a pitch period prototype in a frequency domain representation.

Like Fette, Marston [at page 2, lines 3-4] also describes a digital speech coder that makes use of voiced/unvoiced speech decisions in low bit rate coding. Marston's quantizing and coding units are frames, but parameters are analyzed in four subframe units. Marston also uses a pitch parameter, and describes pitch-based speech analysis, including::

extract a pitch period prototype for the current frame of speech [at page 5, lines 8-10, as obtain a characteristic waveform for each one of four subframes of length equal to the pitch period]; and

obtain a frequency-domain representation of the pitch period prototype [at page 5, lines 24-25, as produce a characteristic DFT spectrum representing the characteristic waveform].

Marston's [at abstract] advantage is truer reproduction of original speech because of analysis and synthesis by pitch-based timing. In view of the common features of Fette's and Marston's quantization and coding, it would have been obvious to one of ordinary skill in the art of speech coding at the time of invention to augment Fette's LPC analysis with Marston's concept of pitch period waveforms from LPC analysis because Marston points out that the pitch-timed analysis is better able to approximate the original input speech.

16. Claim 18 is set forth including the limitations of claims 11 and 16. Fette and Kleider describe and make obvious those limitations as indicated there.

Fette [at column 7, lines 8-19] also describes spectral information in terms of LPC analysis and conversion among representative speech parameters.

However, neither Fette nor Kleider explicitly obtains a short-term frequency domain representation.

Like Fette, Marston [at page 2, lines 3-4] also describes a digital speech coder that makes use of voiced/unvoiced speech decisions in low bit rate coding. Marston's quantizing and coding units are frames, but parameters are analyzed in four subframe units. Marston also uses a pitch parameter, and describes pitch-based speech analysis, including::

calculate a short-term frequency-domain representation of the current frame [at page 5, lines 24-25, as produce a characteristic DFT spectrum representing the characteristic waveform for each subframe].

Marston's [at abstract] advantage is truer reproduction of original speech because of analysis and synthesis by pitch-based timing. In view of the common features of Fette's and Marston's quantization and coding, it would have been obvious to one of ordinary skill in the art of speech coding at the time of invention to augment Fette's LPC analysis with Marston's concept of pitch period waveforms from LPC analysis and represented in the DFT frequency domain because Marston points out that the pitch-timed analysis is better able to approximate the original input speech.

17. Claim 19 is set forth including the limitations of claims 11, 16, and 18. Fette, Kleider, and Marston describe and make obvious those limitations as indicated there. Marston also describes:

18. decompose the short-term frequency-domain representation into amplitude and phase vectors [at page 5, lines 42-50, as represent the magnitude of the complex spectral values and represent the argument of the complex spectral values as phase].

19. Claims 7-9 are set forth including the limitations of claims 1 and 6 and with limitations comprising the functionality associated with using the apparatus recited in claims 17-19, respectively. Because Fette, Kleider, and Marston describe and make obvious those similar limitations as indicated there, these claims thus are unpatentable accordingly.

20. Claims 26-28 are set forth are set forth including the limitations of claims 20 and 25 and with additional limitations similar to limitations recited in claims 17-19 respectively. Fette, Kleider, and Marston describe and make obvious those limitations as indicated there.

Response to Arguments

21. The prior Office action, mailed January 14, 2003 (paper 9), requires corrected drawings, objects to the drawings and specification, and rejects claims under 35 USC § 103, citing Fette. The Applicant's arguments and changes in RESPONSE TO FINAL ACTION filed May 13, 2003 (paper 10) have been fully considered with the following results.

22. With respect to objection to the drawings, the figures including new matter have been canceled. Accordingly, the objection is removed.

23. With respect to objection to the drawings, the changes entered by amendment will assist in communicating the invention. Accordingly, the objection is removed.

24. The possible informalities in the title and month of US Patent 6,456,964 appear on page 4 of the Response to Office Action filed December 9, 2002 (paper 6). That part of the amendment amends page 7 of the specification. An amendment may be filed after allowance as provided by 37 CFR 1.312 (and MPEP § 1303.01).

25. With respect to objections to the specification, the changes entered by amendment provide acceptable descriptions. Accordingly, the objections are removed.

26. With respect to rejection of claims under 35 USC § 102 and § 103, citing Fette alone and in combination, the Applicant's arguments appear to be as follows:

a. The Applicant's argument appears to be that Fette's range of values is not constrained to be only the single value of the range that is "1". This argument is not persuasive because the features upon which the Applicant's argument relies are not recited in the rejected claims. This argument is not persuasive because Fette describes this subject matter at the passages that are specifically cited elsewhere in this Office action.

b. The Applicant's argument appears to be that the weights of Fette that are applied to different parameters in the same frame do not also weight the same parameter across frames. This argument is moot because weights that are applied across frames are described by Fette at the passages that are specifically cited elsewhere in this Office action.

The Applicant's arguments have been fully considered but they are not persuasive. Accordingly, the rejections are maintained.

Conclusion

27. Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703)872-9314, (for formal communications intended for entry)

Or:

(703)872-9314, (for informal or draft communications, and please label
"PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal
Drive, Arlington, VA., Sixth Floor (Receptionist).

28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is (703)305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on (703)305-4379. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office at telephone number (703)306-0377.

June 13, 2003

Donald L. Storm
Donald L. Storm
Patent Examiner
Art Unit 2654